

COPING WITH CHANGE: Operational Art and Force XXI

A Monograph
by
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Aviation



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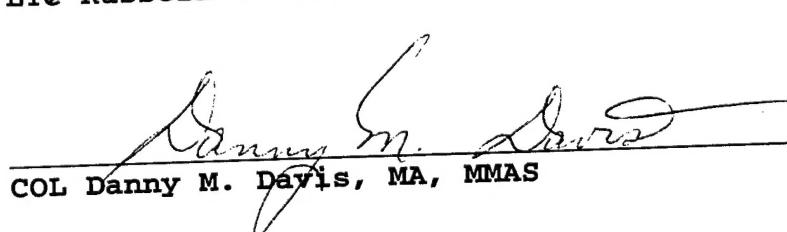
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ABSTRACT

COPING WITH CHANGE: OPERATIONAL ART AND FORCE XXI, by MAJ Teddy C. Cranford, USA, 56 pages.

This monograph discusses the relationship between Force XXI and operational art. It develops a construct demonstrating the Force XXI concept of leverage in warfighting and applies technology and operational art to that construct. The goal of the monograph is to identify the role of operational art in future warfighting.

The monograph uses historical case studies outlining both successes and failures of nations preparing for future wars during times of peace. These case studies produce a construct for analyzing the role of technology and operational art in the Force XXI initiative.

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Introduction

The strategic environment defines the conditions under which a nation conducts its international relations. Following World War Two, the strategic environment found the United States the leader of the free world. During the period known as the Cold War, these responsibilities required the defense of the free world from the communist/socialist movement led by the Soviet Union. This bipolar environment pitted the east against the west in the struggle for political, economic, and military influence in regions throughout of the world.

The U.S. Army's June 1993 version of Field Manual (FM) 100-5, Operations defines strategy as, "the art and science of employing the armed forces and other elements of national power during peace, conflict, and war to secure national objectives."¹ In the Cold War strategic environment, the U.S. adopted the strategy of containing Soviet expansion around the world. To support this national strategy, the U.S. Army developed many different military strategies designed to maximize U.S. Army capabilities against perceived Soviet weaknesses. U.S. Army doctrine translated these strategies into executable operational concepts. The army called its last Cold War doctrine Airland Battle.

Airland Battle described the synchronization of army and air force combat power in time and space to defeat the numerically superior forces of the Warsaw Pact. It drove the development of the U.S. Army's modernization program that resulted in the 1980s fielding of the Abrams main battle tank, the Apache attack helicopter, the Blackhawk

utility helicopter, the Bradley infantry fighting vehicle, and the Multiple Launch Rocket System (MLRS). These weapon systems provided a qualitative edge over their Warsaw Pact counterparts (means), while the Airland Battle doctrine provided guidance for their employment in a manner that maximized their capabilities (ways).

Operation Desert Shield/Storm demonstrated the cumulative effects of this combination of means and ways to achieve military objectives. During the short Gulf War, the U.S. Army, fighting as part of a larger coalition, employed its Airland Battle doctrine against enemy forces roughly replicating Warsaw Pact forces. The Gulf War validated the U.S. Army's warfighting doctrine and related concepts based on mechanized warfare derived from Cold War concepts. The same year Desert Shield began, however, also marked the end of the Cold War.

The end of the Cold War drastically changed the U.S. strategic environment. In less than one year the bipolar state of tension that dominated American thinking for forty-five years ceased to exist. An environment of uncertainty and confusion replaced the Cold War setting. U.S. leaders used terms such as fluid and dynamic to describe this new strategic environment, an environment that seemed to continually erupt in small scale conflicts as factions once kept in check by Cold War influences now fought for control of nations.

In reaction to this new environment, the international role of the U.S. changed from defender to champion of democracy. Its national security strategy changed from containment of communism to promotion of democracy. This new security strategy resulted in an increase in the direct involvement of U.S. forces in the growing numbers of

internal struggles occurring around the globe. In many cases, the U.S. has become involved simply to alleviate the suffering experienced by innocent people arising from internal conflicts. The U.S. has deployed troops to places like northern Iraq, southern Turkey, Haiti, Somalia, Rwanda, and the former Yugoslavia. Throughout all these operations, the U.S. Army continued to use strategy, doctrine, and equipment developed for the Cold War.

The army did this for two reasons. First, the army continued to succeed using its Cold War methods and equipment. The second reason involved time. It takes in excess of five years to implement new doctrinal concepts within the army. During that time, 50 percent of the army's leadership will complete institutional training, return to units, and implement new doctrinal concepts. Add the time required to develop the new doctrine and the figure increases to 7-9 years. For example, the army published its first operational manual to address the new strategic environment in June 1993, three years after the end of the Cold War.

Knowing this, General (GEN) Gordon R. Sullivan, the Army Chief of Staff from 1991 to 1995, began the Force XXI initiative with the goal of developing a method for ensuring the army's success into the next century. He designed the initiative to force the U.S. Army to develop doctrinal concepts applicable to conditions 15-20 years into the future. To accomplish this, GEN Sullivan revived the Louisiana Maneuvers concept, realigned the army's school system, and increased the use of computer modeling and simulations.

GEN Sullivan's vision for the future army relied heavily on the development and application of new technology as the means to maintain the U.S. Army's superiority in the next century. GEN Sullivan often referred to Michael Howard's speech, "Military Science in an Age of Peace" when discussing his vision.² The chief of staff wanted to make sure the U.S. Army did not get it "too wrong" before the next war.

The Problem

Therein lies the purpose of this monograph: Did GEN Sullivan's vision create the very conditions he hoped to avoid? What is the best way to move the U.S. Army into the next century? How will the army apply its military power to win future conflicts? How does the U.S. Army define this application of military power? How does it continue to leverage its capabilities against its opposition to achieve success? This implied goal of ensuring the army can employ its combat power in a manner that maximizes its effectiveness provides the focus for the primary research question. What is the role of operational art in the Force XXI initiative?

In contrast to this focus, the strategic objective of Force XXI is to "transform the force from an Industrial Age Army to a knowledge- and capabilities-based, Power Projection Army . . . by leveraging information technology."³ This implies that information technology provides some advantage or inherit power that will allow the U.S. Army to dominate enemy forces on future battlefields. To succeed, Force XXI needs to fulfill three requirements: it must set the conditions that allow the technologies to multiply warfighting capabilities, incorporate those technologies into systems capable of

influencing events on the battlefield, and develop concepts for applying the technologies to achieve desired results.

Currently, however, Force XXI only develops the conditions that allow technologies to improve army capabilities. The technologies are still under development, slowing the creation of systems that maximize the technologies' potential. Finally, without fully matured systems the army cannot fully develop modes of employment for the new technologies. Time might correct the last two problems, but the current practice of infusing Force XXI's technology into current operating concepts might inhibit their solution.

These three requirements combine to produce the leverage that GEN Sullivan envisioned for the army's future success, leverage that provides the U.S. Army a marked advantage on the battlefield of the future. This translates to a dominant force capable of quickly and decisively achieving the nation's security objectives.

The idea of leverage is essential to both Force XXI and this study. Therefore, it is important to develop some background concerning this concept. Leverage entails the application of military force to accomplish national objectives in such a manner that the force applied achieves the greatest possible results. Operational art represents the current construct for this concept of leverage.

The July 1995 final draft of FM 101-5-1 Operational Terms and Graphics defines operational art as "the employment of military forces to attain strategic and/or operational objectives. . . . Operational art translates the joint force commander's strategy into operational design, and, ultimately, tactical action, by integrating the key activities at all

levels of war."⁴ This definition describes operational art as a concept that facilitates translation to an executable form, in this case doctrine. For example, during the Cold War, the army's Airland Battle doctrine provided the framework for conducting operational art. By its definition, operational art clearly provides Force XXI with a point of leverage for success in the next century.

Assuming the validity of the relationship between operational art and Force XXI's concept of leverage allows the development of the primary research question: What is the role of operational art in the Force XXI initiative? The purpose of this monograph is to analyze the impact of Force XXI's concepts on operational art to validate and/or provide possible alternatives to the current Force XXI initiative. To accomplish this, the author will use case studies of earlier historic incidents or periods requiring nations to make drastic changes within their armies. These case studies will include examples of both successes and failures by these armies in subsequent wars following the significant changes. The study uses the strategic environment, the Force XXI initiative, and institutional change theory as the basis for analyzing how the U.S. Army copes with change.

The Background

The U.S. Army's leadership recognized that the end of the Cold War changed the strategic environment; they failed to realize the true nature of that change. The end of the Cold War changed the strategic environment into the most dangerous environment for

U.S. Army operations: an age of peace. Michael Howard describes this environment as one "when most people do not seriously think that there will be a great war again."⁵

Some might argue that Michael Howard's description no longer holds true in the lone superpower post-Cold War world. Regardless, Howard notes that eras of peace do not necessarily equate to peaceful periods. He allows for increases in internal strife, revolts, and violence during ages of peace. Howard warns that the study of this internalization of violence can so occupy a nation's military that it no longer devotes the resources to maintain their main occupation: preparing for another great international conflict.⁶

Howard's statement concerning the internalization of conflict describes the current state of international affairs. Third World nations that relied on external ties and support made possible by the Cold War competition to maintain internal control began to erupt in violence. These internal conflicts produced second order effects on neighboring countries in the form of refugees and spillover violence. In the current geopolitical system of international affairs, nations increasingly intervene in these internal conflicts once they escalate to large scale fighting or mass migrations of people. Moreover, nations intervene based more on traditional ties of history, ethnicity, politics, and religion rather than with regard to Cold War alliances. Nations can use these traditional factors more readily now because of the change in the strategic environment.

During the Cold War period nations tended to make decisions based on the needs of their alliances balanced against their own interests. Nations made compromises for the good of their alliances. With the end of the Cold War, the international setting allowed nations to act more unilaterally based on their own interests. This produced situations

that found Cold War allies on opposing sides after they intervened in conflicts that resulted from internal failures within nations.

The former Yugoslavia serves as an example of this multinational involvement in local conflicts. What began as a localized conflict expanded to involve nations from around the world. It began with the United Nations sending peacekeeping forces to the region in an attempt to end the conflict. Failure of the U.N. effort to end or mitigate the violence resulted in international support for the combatant factions developing along historic, political, ethnic, and religious lines. Western nations, Russia, newly independent states of the former Soviet Union, and Turkey and other Islamic nations began aligning themselves with opposing sides in the conflict. The Balkans conflict grew to involve two to three dozen nations; most of these nations remained neutral, but some took sides and covertly supported one of the three principal belligerents.

At least for now, diplomacy has brought peace to the region. Still, the underlying causes of the conflict remain and the international community's support is divided among the opposing factions. This type of situation, where nations commit to multinational operations under conditions of impartiality while simultaneously covertly supporting one or more of the warring factions based on older traditional alliances and enemies, defines the new strategic environment. It produces a complex, multipolar geopolitical-military system full of uncertainty and danger.

In addition, vestiges of the Cold War still remain in this new strategic environment. These vestiges continue to provide the primary measuring stick for the U.S. Army and the conceptual foundation for the Force XXI initiative. Force XXI uses the concept of two

Major Regional Conflicts (MRC) based on Cold War force models and constructs for its basic foundation. This brings the purpose of the monograph to the forefront again. Does an analysis based on Cold War models and constructs provide the correct basis for success in the future? Do other alternatives exist?

Force XXI's use of these Cold War models and constructs coupled with future technologies establishes the environment in which the initiative will conduct its operations. The initiative's success is linked to this particular strategic environment. Force XXI begins the development of this strategic environment by describing the possible threats and levels of conflict of the future. This description focuses the initiative's design on given situations and specified threats, threats that consist of modern heavy forces in a medium to high intensity conflict. Using this future, the Force XXI initiative applies current U.S. Army force structures and operational methods combined with new technologies to move into "third wave warfare."⁷ By doing this, Force XXI limits its application to a narrow band of possibilities described within the document that may or may not meet the strategic environment. The reliance on a specific future state makes this assumed future strategic environment an integral part of the U.S. Army's future success.

The U.S. Army needed to develop a new future state because of the end of the Cold War. The end of that struggle produced changes within the world's military structures. Entering an age of peace allowed both sides of the Cold War [Warsaw Pact and the North Atlantic Treaty Organization (NATO)] to reduce the size of their military forces. This presented the leaders of the U.S. military with the problem of a new, often violent,

international setting requiring increased involvement of U.S. forces and a reduction in the forces available to accomplish those missions. All these changes presented great challenges for the U.S. Army and forced a review of its operational methods. These same operational methods that the army recognizes as outdated (but not antiquated) provide the basis for Force XXI's operational methods.

These two events (Force XXI development and the review of the army's operational methods) resulted in parallel, generally uncoordinated efforts to modernize how the U.S. Army fights. One (Force XXI) occurred from a conscious decision to improve the army's capability while the other evolved from reactions to the strategic situation.

The end of the Cold War created an unstable environment that drove the army into the region M. Mitchell Waldrop calls the edge of chaos.⁸ The edge of chaos represents one of the three regions that support his complex systems theory.⁹ The edge of chaos exists between chaos (a region where the high degree of uncertainty precludes prediction, precise duplication, or simulation) and order (which equates to a stable region containing a high degree of certainty that facilitates the prediction of a system's products).¹⁰ Complex systems operating within a changing environment (edge of chaos) produce what Waldrop calls complex adaptive systems.

Complex adaptive systems combine the interaction between their independent agents and reactions to external stimuli (environment) to undergo spontaneous self organization. Self organization involves conscious and unconscious acts to achieve desired results. Systems and individuals exhibit this trait when they organize their actions to provide paths or procedures that overcome obstacles to their desired end state. These systems

adapt to the stimuli of their environment, trying to maximize the benefits for the system.

In essence, complex adaptive systems learn from their environment.

In Waldrop's construct, only complex adaptive systems can survive in today's world.

The inability to adapt to change causes the remaining systems to eventually fail and die.

In 1991, the U.S. Army's leadership faced the same problem: adapt or accept the possibility of failing in the future. Under Waldrop's chaos theory this decision to adapt to new conditions becomes an act of survival. This decision to adapt resulted in the 1993 revision of FM 100-5, Operations and eventually produced the Force XXI initiative.

The 1993 version of FM 100-5, Operations addresses many major issues arising from the end of the Cold War. It contains information pertaining to a power projection army with an expanded mission that includes a new category of missions called Operations Other Than War (OOTW). OOTW incorporates operations from many established security missions and includes: military operations in support of national domestic objectives, low intensity conflict, foreign assistance, and support to the UN. Yet the manual only provides fixes to the challenges facing the army at the time of its writing.

GEN Sullivan wanted more; he wanted the U.S. Army to prepare for 15-20 years into the future. He wanted to take technologies under development and make the army conceptualize their application on the battlefield. GEN Sullivan did not want the U.S. Army learning to fight the last war better; he wanted it ready to fight the next war now. This provided the goal that dominated the development of the Force XXI initiative.

Literature Review:

Force XXI represents the U.S. Army senior leadership's vision for the future. Its purpose is to maintain the army's qualitative edge on the next and subsequent battlefields. To accomplish this, it proposes fundamental changes to doctrine, organizations, and training. Moreover, it includes all echelons of the military-industrial complex from the foxhole to the industrial base. Force XXI authors also recognize that this change must occur within a volatile and dynamic international setting.¹¹

"America's Army, trained and ready, a strategic force, serving the nation at home and abroad, capable of decisive victory . . . into the 21st century. It is a journey . . . not a destination" serves as the Force XXI initiative's vision statement.¹² This vision incorporates six components that provide a trained and ready force. These components are: quality people, training, force mix, doctrine, modern equipment, and leader development. This arrangement of components producing Force XXI constitutes a model. For lack of a better name, it becomes the army's trained and ready model. It receives its stimulus from three sources: change, continuity, and growth.¹³ Inclusion of these stimuli in the trained and ready model creates a system (Figure 1¹⁴) that represents the U.S. Army's process for change, a process that uses "a campaign to evaluate new experiments that will leverage superior American technology to build the Army of tomorrow: Force XXI."¹⁵ This process must produce a force that can continue to meet the army's traditional roles of compel, deter, reassure, and support in a volatile, uncertain, chaotic, and ambiguous world.¹⁶

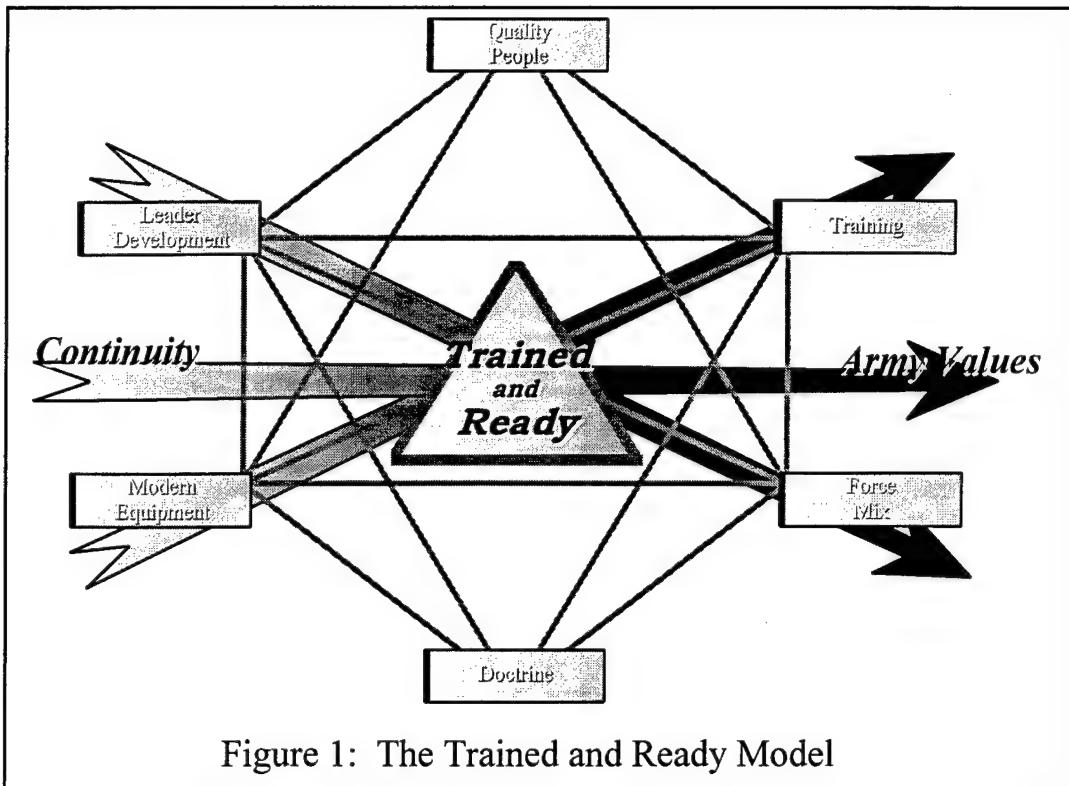


Figure 1: The Trained and Ready Model

Production of the force described above represents the end state of Force XXI. To achieve this end state, Force XXI aims to transform the army in its entirety, maximizing its ability to exploit information.¹⁷ For Force XXI, information represents the catalyst that will enhance the army's capability on the battlefield. Through the digitalization of electronic connectivity throughout all echelons, Force XXI plans to greatly improve the situational awareness of the entire organization.¹⁸

Force XXI conceptualizes improvements in decision making through an improved and more timely flow of information. Information warfare will facilitate quicker decisions on when to strike or act. The same technology will simultaneously provide the necessary information on what and where to strike. All this results in a force of greater lethality, survivability, tempo, and versatility than today's army. These capabilities will

allow smaller forces to accomplish greater tasks than a comparably sized force using 1996 technologies. In addition, the smaller forces of the future will reduce sustainment and deployment requirements, further increasing the warfighting capability of the future army.

This represents GEN Sullivan's vision for the future army outlined in the Force XXI publication. The primary agent tasked with achieving this vision is the commander of TRADOC. The TRADOC commander provides the execution guidance required in the Training and Doctrine Command Pamphlet 525-5, Force XXI Operations: A Concept for the Evolution of Full-Dimensional Operations for the Strategic Army of the Early Twenty-First Century (hereafter referred to as TRADOC Pamphlet 525-5). TRADOC Pamphlet 525-5 provides the medium for presenting baseline concepts outlining requirements for successful U.S. Army operations in the early twenty-first century.¹⁹ The pamphlet defines its purpose in the following statement: "TRADOC Pamphlet 525-5 represents the continuation of change, continuity, and growth, enabling the Army to continue as a relevant force capable of decisive victory into the twenty-first century."²⁰

TRADOC views doctrine as the vehicle for changing the army and achieving the goals of Force XXI. As an organization, TRADOC believes that doctrine embodies the ideas of the army. Yet the document states "doctrine does not predict the future, but sets in motion that which will produce conditions for success. . . . one of the most critical challenges confronting today's Army is continuing development of relevant doctrine."²¹ TRADOC Pamphlet 525-5 takes the nation's new strategic environment, technology, and current capabilities to conceptualize future doctrine.

Technologically, it seeks to exploit advances in the ability to sort, analyze, and disseminate information. By capitalizing on these information-based technologies, the pamphlet describes a quantum leap in the tempo of U.S. Army operations. This operating tempo will allow the future army to decide and act at a rate far exceeding any potential enemy.²²

Reliance on future technologies also ties TRADOC Pamphlet 525-5 to a specific future environment that can utilize these technological advances. Chapter Two contains a description of the future strategic setting used by the initiative as its point of reference. It acknowledges the dramatic changes occurring in the world's geopolitical structure resulting from and causing economic, technical, social, religious, and cultural tension. The document lists five types of threats to U.S. military forces likely to exist in the future. These five categories (phenomena, non-nation, internal security forces, armor-mechanized based, and complex adaptive) also include a description of the conflict conditions or level of violence associated with each category.²³ The chapter closing statement provides a warning concerning future warfare, "The days of the all-purpose doctrinal threat template are gone, just as the days of a single-prescription Army doctrine are gone."²⁴

Implications of this warning shape the description of the Force XXI army found in Chapter Three. The chapter describes an army capable of operating across all five categories of conflict (phenomena, non-nation, internal security forces, armor-mechanized based, and complex adaptive). In addition to sustaining its current strengths (total force, capable of joint and combined operations, and flexibility), Force XXI

requires excellence in five primary areas: doctrinal flexibility, strategic mobility, tailorability and modularity, joint and multinational connectivity, and the versatility to function in war and OOTW.²⁵

The document states that the key to achieving this future force rests in what it describes as battle dynamics. This construct of battle dynamics contains two elements. The first requires the sharing of knowledge concerning battlefield conditions. This is an evolution of the current principle of situational awareness. The second deals with the quality of the army's soldiers derived from a combination of education and training.²⁶

The first element of battle dynamics incorporates the technological advances vital to the success of Force XXI. These technological advances rely heavily on those related to the rapid transfer, storage, and understanding of information. The army envisions improvements in information technologies that will increase the ability of soldiers to understand their battlespace in both speed and clarity. Information technologies facilitate this by providing the hardware and software requirements for the future Army Battle Command System (ABCS). When fielded, ABCS will share information in an internetworked system that provides both hierarchical and non-hierarchical structures. It will provide commanders what the pamphlet terms a common, relevant picture of the battlefield. ABCS will give the commander a real time representation of forces "scaled to their level of interest and tailored to their special needs."²⁷

This reliance on future technologies, however, does not change the fundamental purpose of Force XXI: providing the nation with an army capable of winning its future wars. Force XXI plans to accomplish this by providing the U.S. Army the right leverage

to unbalance its opponents. Its content-based analysis views technology as the lever for the future army. Proper application of technology will allow the army to conduct asymmetrical engagements that over whelm enemy forces, thus achieving the desired end state.

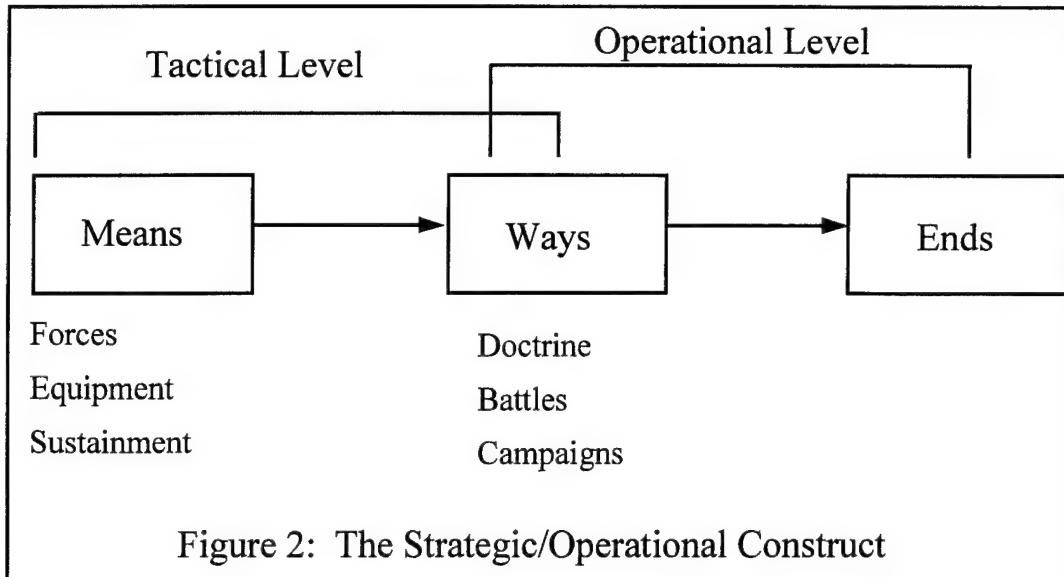
Force XXI describes technology as the lever for successful future army operations. This implies the use of a mechanical model utilizing a lever, force, and body of resistance. The Force XXI initiative, however, does not provide a graphical representation of this model. This study provides such a mechanical model using the concepts of ends, way, and means as a foundation. These three elements readily explain national and military operations. For this reason, the study calls this the operational/strategic construct. The elements of this operational/strategic construct provide the framework necessary to analyze the role of technology and operational art in the Force XXI initiative.

Ends provide the criterion for a successful operation by setting the national political conditions that must exist to conclude an operation. Militarily, this element of the operational/strategic construct begins by using these national political ends to ascertain a definition or description of the military operational goal(s). To accomplish this, the Joint Staff develops military end states that support national policy objectives by establishing attainable subordinate objectives which in turn set the military conditions required for the realization of the national political end state.

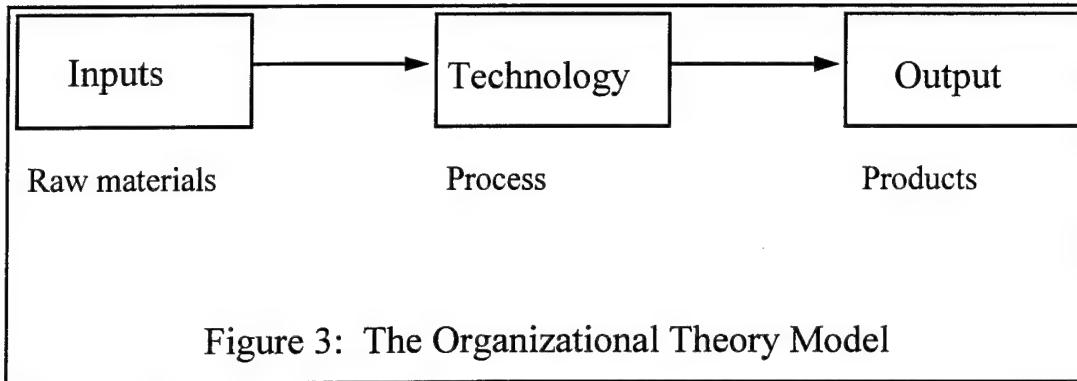
After the military translates national political goals into military end states, it develops operational plans (ways) to achieve those ends. Military plans exist at all levels

of organization within the military and at all three levels of war (strategic, operational, and tactical). Strategic planning sets the conditions for the application of force to achieve strategic policy (national political) goals. FM 100-5, Operations states "strategic perspectives are worldwide and long-range. Strategy is concerned with national or, in specific cases, alliance or coalition objectives."²⁸

If the strategic level of war encompasses the application of national and coalition resources to obtain the desired end state, then it cannot provide the construct for Force XXI. Force XXI relies on the military contribution to the strategic level of war. This leaves the operational and tactical levels of war to provide this point of leverage. FM 100-5, Operations provides the definition of the operational and tactical levels of war. "The operational level of war provides the vital link between strategic objectives and tactical employment of forces. . . . through the design, organization, and conduct of campaigns and major operations."²⁹ The tactical level of war achieves these operational goals through battles and engagements. These definitions of the levels of war taken in context with TRADOC Pamphlet 525-5 reinforce the earlier statement proclaiming the operational level of war as the point of leverage for Force XXI. Figure 2 displays this construct.



Organizational theory provides an alternative model to the strategic/operational construct of ends, ways, and means. The primary organizational production model uses inputs, process, and outputs to define the system. In this construct, inputs are the raw materials and manpower required to make a finished product. The process includes the machines (technology), skills, infrastructure, and time required to manufacture the product or provide a service. Outputs are the goods and/or services produced by the combination of inputs and technology. Figure 3 represents the organizational theory model.



The two systems (strategic/operational and organizational) are remarkably similar with each containing components that perform roughly the same functions. Inputs provide raw material resources similar to means. Process describes the application of energy to produce a product much like the application (ways) of military force to obtain goals. Both systems seek a finished product (output and ends). Using this construct, the point of leverage for Force XXI rests in the activity that transforms resources into a desired end product. In Figure 3 (The Organizational Theory Model), technology is the activity that accomplishes this transformation. Ways perform this function for the strategic/operational construct (Figure 2).

Technology represents the major difference between the two systems. In the military construct it resides in means as a tool for the system to use. In the organizational construct the process relies on technology to transform raw materials to a finished product. In many instances, automated technology is the entire process for the organizational model.

Neither of these constructs, however, provides the necessary means for analyzing Force XXI. The strategic/operational construct does not use or possesses the capability to

incorporate the idea of technology producing extraordinary effects on the process. The organizational model does possess the ability to portray the effects of technology in the process, but it cannot be readily adapted to the concept of warfare. These two systems provide the theoretical foundation for building a system for analyzing Force XXI. The next step is to establish a historical baseline for analyzing the Force XXI initiative in order to further develop the analytical model.

Historic Case Studies

The end of the Cold War is not unique in introducing an age of peace, nor does it mark the first time the U.S. Army underwent major change. The most recent of these major changes prior to the end of the Cold War occurred after the U.S. Army's last major war: Vietnam. Vietnam dominated U.S. Army operations for almost ten years. It defined a generation of soldiers and profoundly affected the way American society viewed war. When the war ended, the U.S. Army found itself sadly deficient in its capability to fight a modern war. The changes to the army of the 1970s greatly resembled what has occurred to the U.S. Army following the Cold War.

The reduction in U.S. military involvement in the Vietnam War in the early 1970's resulted in a drawdown and reorganization of the U.S. Army. Army planners saw the opportunity to reorganize the Continental Army Command (CONARC) during this drawdown. In 1972, the army established the U.S. Army Training and Doctrine Command (TRADOC) and the U.S. Army Forces Command (FORSCOM) to replace CONARC. TRADOC assumed control of all the army's schools and training centers

(except the U.S. Army War College and the U.S. Military Academy). FORSCOM took command of all army operational units based within the United States.³⁰

TRADOC received responsibility for the development and dissemination of doctrine because doctrine represented the guiding principles for training. In addition, the army assigned the U.S. Army Combat Developments Command to TRADOC. The Combat Developments Command conducted research regarding new technologies and techniques for land warfare. By doing this, the army consolidated doctrine development, soldier training, and the research into the application of new technologies and techniques under one command. This gave TRADOC the ability to change the way the army thought about war.³¹

Three months into this reorganization an Arab-Israeli War erupted on Oct 6, 1973. The Yom Kippur War represented a conventional war between modern armies equipped with mostly first line U.S. and Soviet equipment. The U.S. Army eventually used this conflict as the basis for development of their new doctrine. One of the lessons the Yom Kippur War dealt with the lethality of the modern battlefield. This lethality resulted from the combination of new weapon systems with combined and joint tactics.

TRADOC began to brief the results of their assessment of the war in early 1975. Their study concluded that the U.S. Army lacked the capability in equipment, tactics, and mental attitude to fight a similar war. The army's leadership recognized the need to address these shortcomings in equipment, tactics, and psyche. Overcoming these shortcomings involved making changes at every organizational level in the army. To fix

these problems, TRADOC "embarked on a program to reorient and restructure the whole body of army doctrine from top to bottom."³²

TRADOC produced the 1976 edition of FM 100-5, Operations to address these shortcomings and prepare the army for the next war. Once the major army field commanders accepted the new doctrine contained in the manual, TRADOC began implementation. This implementation entailed a myriad of tasks programmed over several years.

The U.S. Army used the Yom Kippur War to change from a war-driven, low intensity combat army to a European-centered, mechanized army. The U.S. Army's force structure in 1975 (after its withdraw from Vietnam) consisted of six heavy (armored or mechanized) divisions, four heavy brigades, nine light (non-mechanized) divisions, and three light brigades.³³ The lessons from the Yom Kippur War showed the U.S. Army the requirements needed to fight a modern mechanized war. The 1976 version of FM 100-5, Operations shifted the psyche of the army from the jungles of Vietnam to the plains of central Europe. This shift of the institution's intellectual power resulted in quick discovery of better ways to fight a European war. This would eventually lead to a 1982 revised FM 100-5, Operations containing the foundation for the Air Land Battle doctrine of 1986.

TRADOC began teaching the new doctrine to change the army's psyche and tactics. "Fight out numbered and win" became the army's motto. TRADOC required the proponents for lower level manuals (branch schools) to rewrite branch tactical manuals to reflect the revised doctrine. More importantly, TRADOC focused the research,

development, and acquisition efforts of the army on a mechanized, European war. The needs of the new doctrine drove modernization.

The army changed its approach to fighting wars in 1976. It did this by creating the right organization (TRADOC), learning from history, and implementing the required changes. In TRADOC the army established a system with the capability to implement, assess and update doctrine. Since 1976, TRADOC has completed and implemented major rewrites of FM 100-5, Operations in 1982, 1986, and 1993. TRADOC's organization allowed the army to accomplish this feat.

The army responded to a change in its strategic environment by creating an organization (TRADOC) capable of managing change within the army. TRADOC oversaw an intellectual renaissance that developed the ways (doctrine) to fight its future war. Requirements of this doctrine drove the army's modernization, training, and manning.

The period between World Wars I and II greatly resembled the current international setting. Recognized international powers had been allies during the First World War and generally remained civil in their postwar relations. Technological advances drastically changed the nature of armies and warfare. Finally, nations attempted to use an international body (League of Nations) to mediate international disputes. During this period, militaries around the world began to study the last war and prepare for future conflict.

How these nations dealt with this age of peace would profoundly affect their performance when war came again to Europe. It made them, winners or losers. In

addition, the interwar experience affected the ability of these nations to learn and adapt to situations during the war. The interwar years established each military's mental model concerning modern (1930's) warfare that influenced each nation's warfighting doctrine and ultimately their operations during World War II.

The warfighting doctrine of the interwar years, like the current age of peace, relied on the experiences gained from the results of the last war. France, Britain, Russia, and the U.S. viewed themselves as the victors while Germany and Austria perceived the war as a draw. The Treaty of Versailles, however, made Germany and Austria the losers and put all blame for the war on those nations.

Experiences of the First World War provided the foundation used by each nation (with the exception of Russia) to prepare for their next war. World War I left a profound and different legacy in each of the participants. The early participants (Britain, France, Germany, and Russia) remembered the lessons of World War I. In the west it was the power of prepared defensive works, while in the east it was maneuver and concentration which dominated these lessons.

In the west, the allies used technology to overcome German and Austrian defensive works. Unable to match the technology of the allies, the Germans relied on tactics to overcome the allied trench lines. Neither one of these approaches provided the victory sought by both sides, but each gave sufficient success to validate their usefulness. It resulted in the incorporation of technological advances into defensive positions for the French. They built the Maginot Line that addressed all the shortcomings derived from the lessons of the First World War. It contained a series of interconnected and mutually

supporting fortress backed by mobile armored reserves designed to close penetrations of the defense. To the French the tank was a mobile fortress. In the Maginot Line, France created the ultimate trench line. As a nation, they believed the Maginot Line made successful attack from Germany impossible.

They also remembered the German's attack through the low countries. To counter this, France modernized its armed forces with tanks, airplanes, and weapons equal or better than those fielded by other nations. These efforts produced a powerful French Army considered by most nations as the best in Europe. Yet the French remained defensive in their primary approach to war. They intended to destroy enemy armies along their seemingly impregnable frontier. By adapting technology, they perfected the ways and means for fighting the last war better. Unfortunately for the French, they incorrectly assumed their most likely opponent would also fight the last war.

The allies placed extreme restrictions on the size and equipment of the German Army following World War I. However, this did not prevent them from preparing and training for war. Like the French, the Germans took their WWI experiences and applied them to their vision of the next war. They recognized trench warfare's role in modern battle and its devastating effects against frontal attacks. The Germans wanted to avoid trench warfare by maneuvering around and enveloping defenses.³⁴ To this end, they put their energies into the improvement of their storm trooper tactics of WWI. They sought to avoid prepared defenses by maneuver. Failing that, the German Army planned and practiced the penetration and envelopment of defensive positions. The Germans used technology as a tool to enhance those operations. Moreover, the restrictions of the

Versailles Treaty prevented the German Army from possessing many of the more modern tools of war. To overcome this restriction, the German Army used civilian equipment not specifically designed for war, but capable of conversion to military service. This substitution of equipment conditioned the German Army to learn and adapt to situations beyond their control. It provided them with the ability to learn and adapt during operations, thus increasing their flexibility on the battlefield.

The U.S. Army experience during the interwar era resembled that of the German Army. Following the war, the U.S. reverted to its traditional view of a small peacetime professional army coupled with leanings toward isolationism. These self-imposed policies placed the same type of restrictions on the U.S. Army that the Treaty of Versailles placed on the German Army. Although the U.S. Army did modernize, small capital outlays prevented fielding of equipment equal to that found in European armies.

One of the lessons the U.S. Army learned from WWI involved the importance of institutional training of mid-grade officers (captains through lieutenant colonel). This training occurred at Fort Leavenworth's General Service and Staff College. Leavenworth graduates serving with the American Expeditionary Force (AEF) of 26 divisions had included all the General Headquarters, AEF principal staff department heads, five division commanders, most of the division chiefs of staff, 59 brigade commanders, and 177 regimental commanders. The contributions of Leavenworth graduates convinced the army that it needed to increase the number of graduates in the army, so the army increased the numbers attending each class. In addition, the curriculum changed to a two year course, one year focused on division level tactics and the second on the corps level.³⁵

Since limited class sizes still precluded every officer from attending the course, the army established the Correspondence School to allow all officers to receive the Leavenworth education. The army also began a three month long course for reserve officers. Finally, the army began publication of Military Review in 1922 to stimulate intellectual interaction within the service. These changes to the institutional teaching of the army's mid-grade officers produced an officer corps with a better understanding of war and an increased analytical capability concerning its waging.

As the U.S. reverted back to its traditional views of international relationships, so did Britain. World War I served to validate the British concept of a small army for empire maintenance backed by a strong navy to protect the British Isles. Moreover, WWI showed Britain the importance of maintaining strong continental alliances (France and Russia) which would provide the preponderance of manpower comprising the land force in a major war.

In keeping with these beliefs, Britain fielded a small but modern army. The British Army existed to maintain the empire, and in the case of a major war, to delay enemy forces (in conjunction with a major continental power) until the empire could mobilize. To safeguard the home islands, Britain built a powerful fleet and a strong air force. Building a strong air force demonstrated the vision of British leadership. They saw that technology provided new means to attack the Great Britain from the air. To counter this threat, the British developed very capable defensive fighters (defensive because of their limited range).

As for the army, British innovations in armored warfare began during WWI. Following the war, British officers began to improve on the tactics of armored warfare developed during the war. They laid the foundation for high tempo maneuver warfare involving tanks and motorized infantry to conduct penetrations and envelopments of defensive positions. Unfortunately these tactics required a much more robust and expensive British Army than funding would allow. In the end these innovators lost to those supporting the traditional view of warfare.

Unlike the other major participants in WWI, postwar events mitigated the influence of Russia's experiences on their view of future war. Russia, defeated both internally and externally, would draw upon the experiences of their civil war, World War I, and earlier wars to formulate their approach to warfighting. Of all the nations of the world, Russia would best predict the conditions of her next major war. Not only would the newly founded Soviet Union's military leadership better predict the character of their next major war, they would also develop the plan required to achieve victory. Based on past experiences, the Soviet Union's leaders developed a Machiavellian (ends justify the means) outlook toward warfighting. Soviet military operations centered on the objective of the war. Soviet strategy and tactics did whatever required to achieve the desired end state. Using this outlook, the Soviets intended to trade territory to exhaust the invaders until the Soviet Army could counterattack and destroy the invading army.³⁶

This concept of war produced a system that maximized the cumulative results of battles and engagements to achieve victory. This system allowed Soviet military and civilian leaders to remain focused on the end state and view every battle as a means to an

end. No battle was lost, they were merely not won, because every battle wore down your enemy, bringing him closer to culmination.

It was a strategy of exhaustion that relied on attrition warfare to facilitate a war of annihilation. Every engagement contributed to the Soviet's final victory. By adopting this method, the Soviet Union formalized the rudimentary foundation of operational art. Unfortunately, the officer purges of the Soviet Army conducted by Joseph Stalin during the 1930's prevented the Soviet Army from converting these concepts into a defensive plan. These same purges also effected the Soviet Army's preparedness and reaction to the German attack.

Analysis

Analysis of Force XXI begins with the creation of a construct capable of displaying the concept of leverage contained in the Force XXI initiative. The next step applies this construct to the historical examples of the literature review. This will facilitate a comparison between the different approaches for change. The comparative analysis will be used to answer the research question.

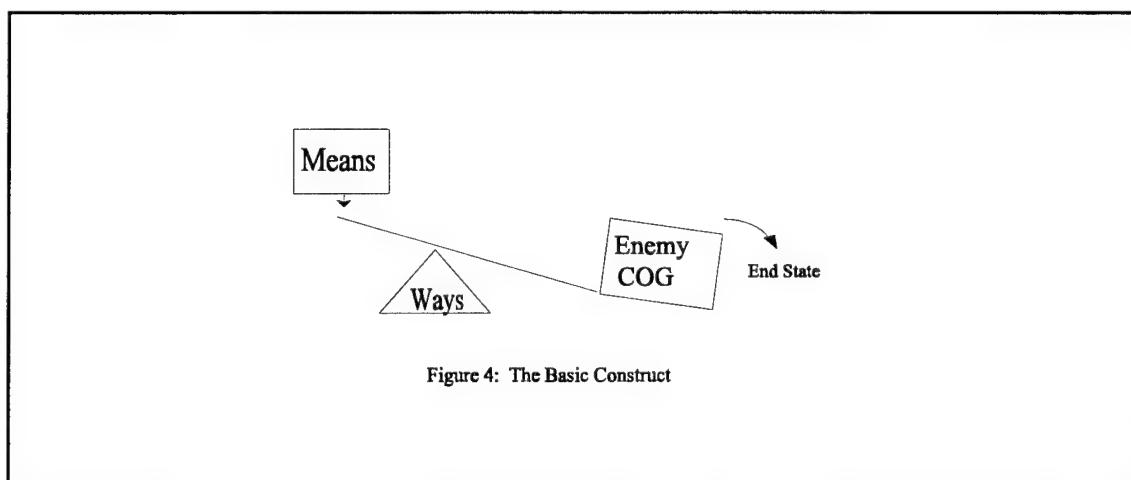
The metaphoric relationship between Force XXI and physical science created by the use of the concept of leverage facilitates the creation of a geometric-based construct, a construct containing four major components: a lever, a fulcrum, a resistance, and a force. Each of these symbolizes part of the political-military strategic model.

Force represents the sum of the military's potential derived from resources (material and soldiers) and organizations. In other words, it provides the means. The fulcrum

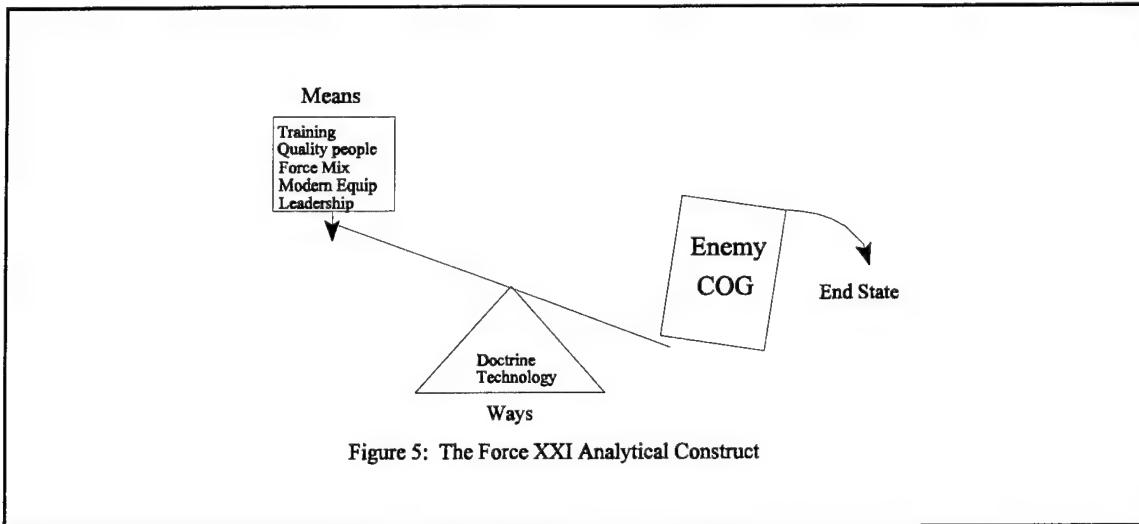
represents the application of these means; the ways. To succeed, the system must overcome resistance, thus achieving the desired goal or end state. Finally, the inseparable relationship between these three components (ends, ways, and means) in both the analytical and strategic construct provides the lever or link that allows the system to function.

The construct works by turning the potential energy of the means into kinetic energy that unbalances the enemy. Unbalancing the enemy requires defeating or incapacitating its ability to continue the war. Carl von Clausewitz describes this concept as defeating the enemy center of gravity. The center of gravity provides each nation the ability to conduct operations on the field of battle. It is "the hub of all power and movement, on which everything depends. That is the point against which all our energies should be directed."³⁷ Defeating the center of gravity should precipitate end state accomplishment.

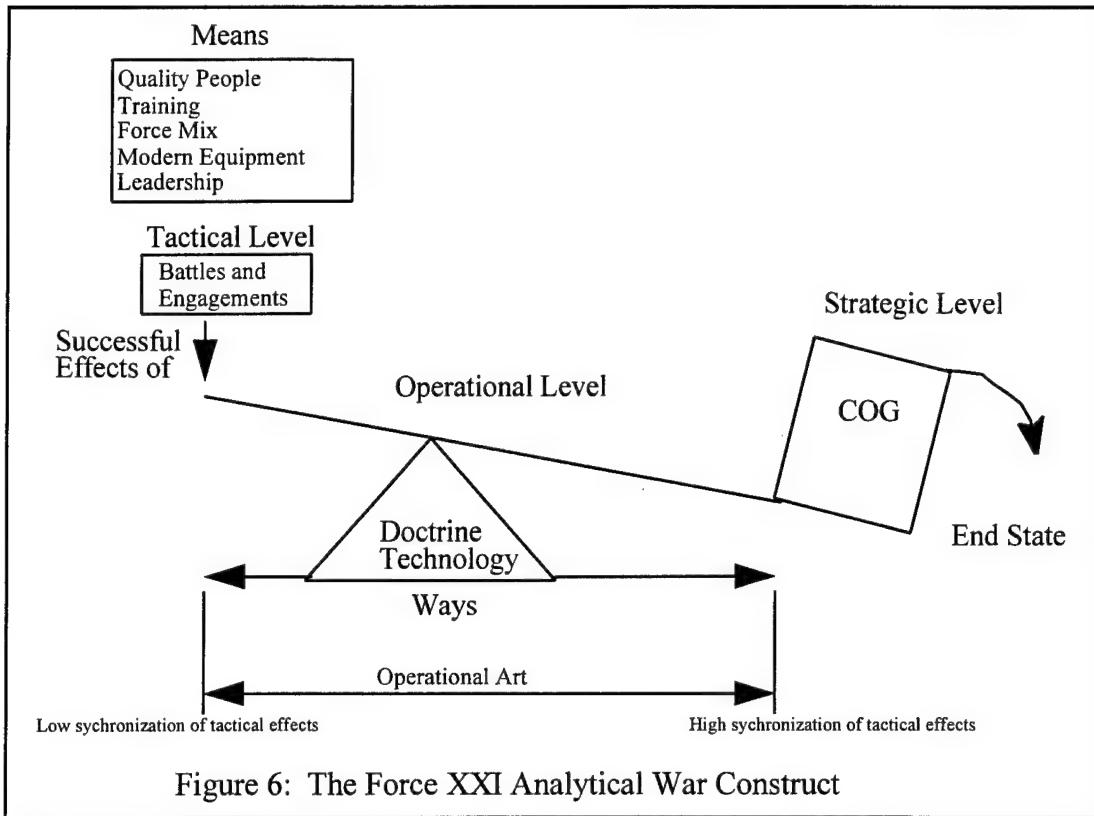
Figure 4 displays this basic construct.



Applying this construct to Force XXI requires liberal interpretation of GEN Sullivan's intent. The six components of the trained and ready model (training, quality people, force mix, modern equipment, leadership, and doctrine) easily relate to the basic construct with one exception: technology. Normally, means include technology as one of its subsets, but GEN Sullivan's intent makes technology part of the point of leverage or fulcrum. Figure 5 shows the evolution of the basic construct into the Force XXI analytical construct.



The final evolution of this construct requires adding the element of warfare. To accomplish this transformation, the three levels of war are applied to the analytical construct. Their definitions provide the information needed to insert each level in the model. The tactical (battles and engagements) level is linked via the operational level to the strategic level. Figure 6, represents the final version of the model.



The mechanics of this construct are simple. The operational level of war (major operations and campaigns) provides the medium for the synchronization of the effects of the tactical level's battles and engagements. Operational art allows the tactical level to exert an aggregate cumulative downward force on the lever. Without the operational level of war and its associated operational art the system relies on the effects on the result of each battle or engagement individually to tip the enemy's center of gravity. In other words, uncoordinated and unsynchronized tactical level operations would require decisive results to achieve the strategic end state. Failure to achieve decisive results creates insufficient force to unbalance the enemy's center of gravity and invites disaster and failure.

Recent examples of the operational art's two synchronization include the Gulf War, Vietnam, and World War II. The Gulf War demonstrated what happens when a nation successfully coordinates effects of battles occurring on air, land, and sea to achieve a desired end state. During the Gulf War each individual engagement compounded the damage done to the Iraqi military reducing its ability to fight. Vietnam provided an example of the opposite. In that war, the U.S. failed to coordinate its battles and engagements to achieve a desired strategic end state. The U.S. fought and won almost every battle and engagement but none possessed enough significance to force the North Vietnamese to end the conflict. Simultaneously, the North Vietnamese applied all their national efforts to achieve their desired end state and eventually won the war.

World War II provided an example on a grand scale involving numerous nations fighting on multiple fronts and theaters. In addition, both sides practiced the operational art by arranging their battles and engagements to achieve strategic ends. The error, however, resided in one side (the Axis) setting unattainable strategic goals. As pointed out by an anonymous German general's statement at Nuremberg: "A mistake in strategy can only be made good in the next war." The war was marked by ferocious fighting on land, sea, and air that occurred simultaneously throughout the globe. Eventually, the cumulative effects of those battles defeated the Axis powers.

This influence of operational art tends to support a protracted or drawnout view of modern warfare that provides the time required for the cumulative effects of to unbalance an enemy. It, however, only applies to wars not involving the use of weapons of mass destruction. The protracted nature derives from the ability of modern nations to absorb

losses and continue to function as nation-states. Weapons of mass destruction make individual battles and engagements much more decisive thus reducing the importance of operational art.

This point of reference becomes important when considering the nature of Force XXI's war. If the force is designed to fight and win a conventional war, then it must consider the importance of operational art in fighting a potentially protracted war. This brings the thesis question to the forefront: What is the role of operational art in the Force XXI initiative? Answering this question using the construct requires applying the model to earlier historic examples to determine how the actions a nation takes prior to war influence its performance during that war.

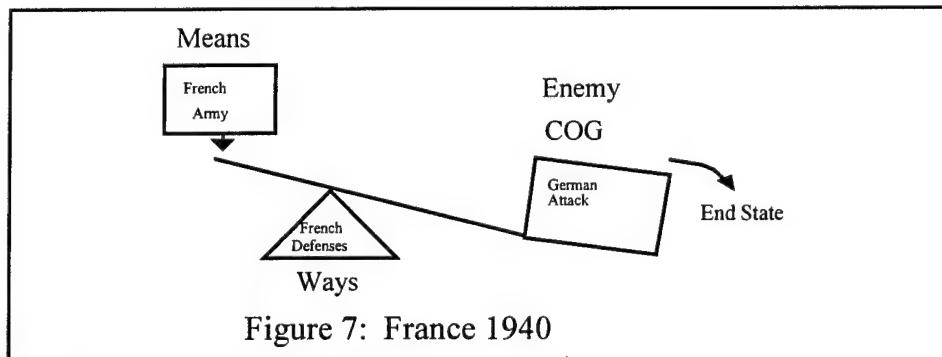
World War II:

France prepared for World War II by studying how it fought World War I. The nation adopted a course of action that relied on improvements in technologies that increased the lethality of the defense. Military innovators were shunned and pushed to the side by a military shaped by the horrors of World War I. France began WWII with more and better equipment than that of the German Army. Yet German armies overran and defeated France in short order.

Part of this failure resulted from a failed national strategy, part from the surprise of the German attack, and part from failure to understand the nature of future war. France modernized the French Army without fundamentally adapting its intellectual approach to war. This failure prevented the French Army from learning from the past in order to

adapt and anticipate the future. It also precluded the French from maximizing the benefits from their superior equipment. They planned to exhaust the invading enemy with strong fortified positions and then counterattack to complete the enemy's destruction. Yet they failed to create or train a force capable of completing these tasks. The Maginot Line was incomplete in France and did not include the border shared with the Low Countries. As for the counterattack, the French Army did not establish a strong, cohesive, mobile force capable of exploiting successes gained by the defense.

During the fall of 1940, the German Army outfought and out-thought the French. France and its allies probably could probably have survived failure in one of these areas, but not both. Using the Force XXI analytical war construct, the French (and their allies) inability to coordinate a coherent plan for defense or offense moved the fulcrum (ways) to the far left (low synchronization). To win, the defensive battle needed to destroy or defeat the main German attack to unbalance the German war plan. In this case technology failed to increase the effects of the French war plan. It merely provided the fulcrum for the lever without improving the French chances of success (see figure 7). It also shows the French failure to practice the operational art in their defensive doctrine.



Unfortunately for the French, the Germans executed a good plan fairly well, adapting to problems caused by French and allied resistance. Initiative, speed, and shock defined the German way of war in 1940. It resulted from lessons learned during the interwar years. Their goal was the rapid defeat of the French and the destruction of the British Army on the continent. The static defenses of the French produced a German plan designed to 1) envelop the French Army and attack its positions from the rear while simultaneously 2) destroying the British Expeditionary Force (BEF) and 3) capturing Paris.

The Germans concentrated their efforts to achieve these mutually supporting but independent goals. For the Germans to achieve any one of these three goals spelled disaster for the allies. This condition moved the fulcrum of the Force XXI analytical war construct somewhere near the far right (high synchronization). With the fulcrum in this position, every battle the Germans fought helped to keep the French and allies off balance. The cumulative effects of these battles eventually unhinged the defenders and began the dynamics that defeated the French. Only Hitler's intervention in halting the offense unwittingly saved the BEF at Dunkirk and prevented the Germans from obtaining all three goals.

A year later in the east, the Germans executed a fair to good plan well, only this time their actions did not defeat their opponent but rather assisted the Soviets in transforming their defensive concepts into reality. These defensive concepts required the Soviet Army to trade space for time to exhaust the invading Germans. Tactically, the Germans surprised the Soviets and inflicted horrendous losses in personnel and material. Once

joined in battle, German surprise and tactical success in conjunction with the inexperience of the Soviet Army forced the Soviets to fight a delaying action. In essence, the German success helped the Soviet leadership fight the war its generals had conceptualized since the 1930's. This action cost the Soviets tens of thousands of their soldiers, but it also inflicted losses on to that weaken the German Army as they moved deeper into Soviet territory.

The Soviet leadership eventually began to purposely combine the delaying actions with counterattacks envisioned by the Soviet generals ten years earlier. Stalin and his senior leadership had begun to practice the operational art. From this point forward, both sides on the eastern front used the operational art; it was a close run contest. In the end, the Soviet's execution and planning got the upper hand and the Soviets stopped the German advance.

When this occurred, the roles reversed; the Soviets turned to offense, the Germans to defense. The war in the east became a brutal slugfest of blow and counterblow between two talented armies. Once again the cumulative effects of battles decided the war. Germany could not recover from the endless assaults sent against it from the land and air.

Soviet military operations sought the total destruction of Germany. The Soviet Army penetrated, enveloped, encircled, captured and destroyed whole German armies enroute to Berlin. Soviet operations were at the far right of the synchronization scale. Additionally, the inability of the Germans to recover from losses increased the negative effects of battles and engagements.

Meanwhile in the west, the allies attacked Germany on a broad front, maintaining constant pressure to prevent the German Army from establishing strong defensive positions. The allies also executed a strategic bombing campaign designed to destroy the war production and sustainment capability of Germany. In the south the allies moved from southern France into southwestern Germany. All three fronts (east, west, and south) aimed at the heart of Germany with the destruction of the German Army as the intermediate objective.

The western allies, like the Soviets, operated with the fulcrum to the right of the lever. These forces also faced a German Army that conducted synchronized combat operations. This made advances in the western theater a slow, contested fight similar to that in the east.

World War II served as an example in which all major participants conducted war using the operational art. In the Pacific, U.S.-led forces conducted a campaign of island hopping in the face of a Japanese campaign of static defense designed to wear down the attacker. The Japanese established a defense in depth by using the island chains located in the Pacific to force the allies to expend their energies assaulting, reducing, and capturing these islands. Japan used a strategy of exhaustion with the aim of winning territorial, diplomatic, and economic concessions from the allies. In the end, the ability of nations to generate forces and combat power while absorbing their enemy's blows decided the war in all theaters. Both sides executed plans designed to synchronize battles, engagements, and major operations to achieve their strategic end state.

The U.S. Army and the 1976 version of FM 100-5, Operations:

The 1976 version of the U.S. Army's capstone doctrine manual resulted from a radical shift in the perceived strategic environment. It actually marked the return to the nation's primary security concern of the Cold War following ten years of fighting in Southeast Asia. Again, the U.S. focused on a European confrontation with the Soviet Union, but now the U.S. lagged behind the Soviet's ability to wage large scale conventional warfare. The Yom Kippur War demonstrated that fact.

To meet this challenge the U.S. Army began to reorganize, modernize, and update its doctrine detailing how it fought wars. GEN Depuy's 1976 version of FM 100-5, Operations was the first step in a process that would eventually produce the army's Airland Battle doctrine. The 1976 version revitalized the army's intellectual approach toward a difficult problem (fighting outnumbered and winning) and produced a start toward accomplishing the desired results. From its conception, the controversial nature of the manual created ripples of intellectual discussions within the army that quickly turned into tidal waves.

This intellectual debate was one of the goals GEN Depuy wanted to achieve in his drive to prepare the army for its next war. He wanted commanders to think about options available in order to teach them flexibility rather than reliance on rote, schoolhouse solutions. The manual was designed to be prescriptive rather than descriptive. His vision served the army well.

Force XXI:

GEN Depuy had provided and translated a vision for the U.S. Army's future in 1976. Michael Howard would probably agree that he got it about right. Force XXI's emphasis on technology requires defining the relationships between the Force XXI analytical war construct (figure 5) to assist in determining the validity of the construct. Does the technology of Force XXI revolutionize warfare, thus negating the construct? If not, how does technology affect the operational art?

To answer the first question requires defining revolutionary change in warfare. One existing definition states that to effect a revolutionary change in warfare requires four distinct events.³⁸ A revolution must start with the introduction or maturation of new military technologies. The military must then incorporate these technologies into new military systems. These new technologies and systems require the adoption of new operational concepts. Finally, organizational adaptation must occur.³⁹

These four events occur over time as a military works to exploit the advantages to be gained from new technologies. The information technologies of Force XXI do not currently meet the four conditions necessary to qualify as revolutionizing warfare, so the Force XXI analytical war construct stands. GEN Sullivan views technology as providing the means to decide and act faster than your opponent. This will clearly improve the army's ability to synchronize the effects of its operations to unbalance its opponent, but the changes are not revolutionary.

Still, information technology represents a tool to assist the army in the synchronization of its efforts to obtain a stated goal. Yet information technology in itself

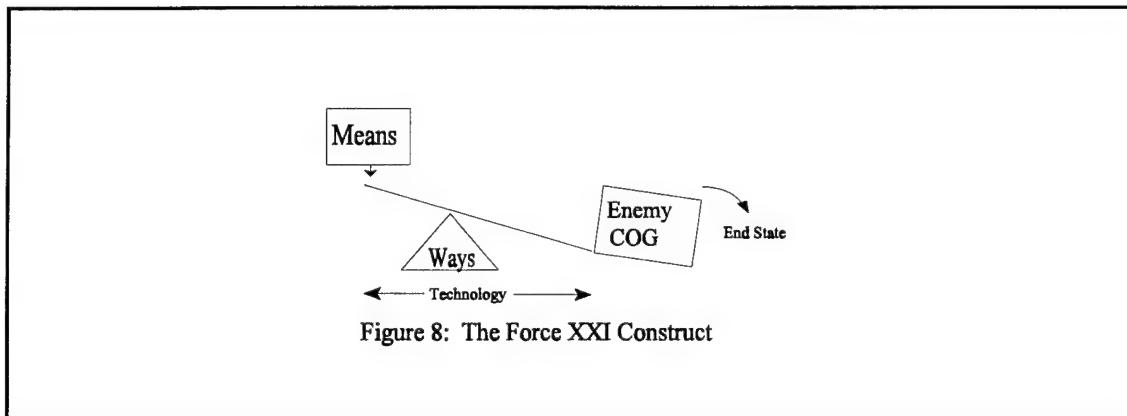
does not synchronize the actions of the U.S. Army. Information technology is equivalent to giving a writer a better pen. The pen doesn't make him a better writer, it just makes it easier to write. In the case of Force XXI, information technology is designed to make military decisions both easier and faster.

Moreover, Force XXI and its information technology support the distributive battlefield that will increase the problem of synchronization. The distributive battlefield, with its battles and engagements separated in time and space, requires extraordinary efforts to synchronize the effects of actions to achieve the desired end state. Force XXI capabilities provide the potential to strike at the enemy center of gravity at a much early point in time than the current force. In its extreme, Force XXI produces multiple, asymmetric, simultaneous engagements throughout the battlefield. Yet Force XXI does not address this increase in means with a corresponding change in its ways.

Finally, what happens if the transition into the information age does not result in a revolution in military warfare? Force XXI success resides in technology bestowing a decided edge to the U.S. Army in conflicts with its potential enemies. What happens if the enemy decides not to or does not possess the capability to fight a high technology war? How do technology and Force XXI assist the military commander in synchronizing operations to achieve results in that type of environment? Simply stated, Force XXI fails to address these problems.

These questions support the true leverage of Force XXI that must derive from the application of combat power against an adversary to achieve results. In other words, Force XXI's lever is the operational art. Technology might make some components of

the operational art easier and faster, but it takes an insight into warfare that technology cannot provide. Force XXI foretells of a revolution in warfare, but it cannot occur without a corresponding intellectual component. Force XXI does not develop or incorporate this intellectual component in its vision of future warfare. Force XXI erroneously relies on technology in and of itself to provide and facilitate the revolution. This view of Force XXI produces a construct of warfare much different from the analytical construct shown in Figure 5. Figure 8 displays this construct.



Conclusions:

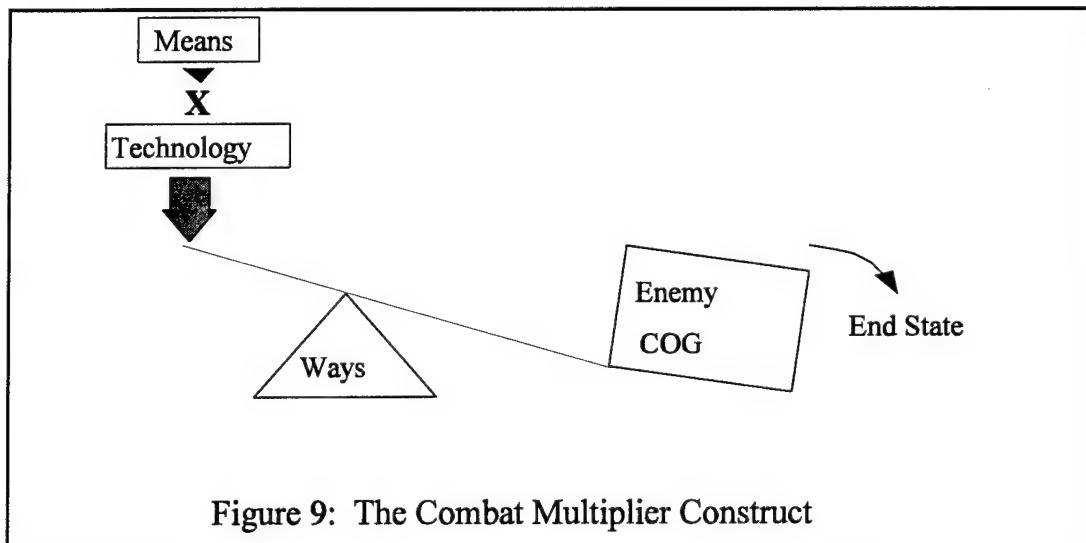
Historically, the case studies validate the need to meet the four conditions required to revolutionize warfare. Under these conditions, not all new technologies result in a revolution to warfare. Most simply improve current processes. In either case, an intellectual component exists that facilitates the use of new technologies to improve an army's warfighting capability. Without this intellectual ability to understand the

possibilities of new technology, no revolution in military operations can occur.

Regardless, new technologies still must compliment military practices to achieve results.

Technology can and does serve as a force multiplier on the battlefield, but so do other factors such as position, firepower, and leadership. In fact, any element on the battlefield that provides one force an advantage over its opponent increases (multiplies) its chances for success. Yet these conditions only apply for a given situation or battle; armies must reestablish these conditions for every battle. None of these individual battles will end the war and obtain the desired end state unless a battle results in a decisive victory (decisive to the degree that further battles are unnecessary).

In both of these cases (sequenced and decisive battles), technology only increases the downward force on the lever (figure 9). Unlike the Force XXI construct (figure 8), technology does not move the fulcrum. Under these conditions the fulcrum



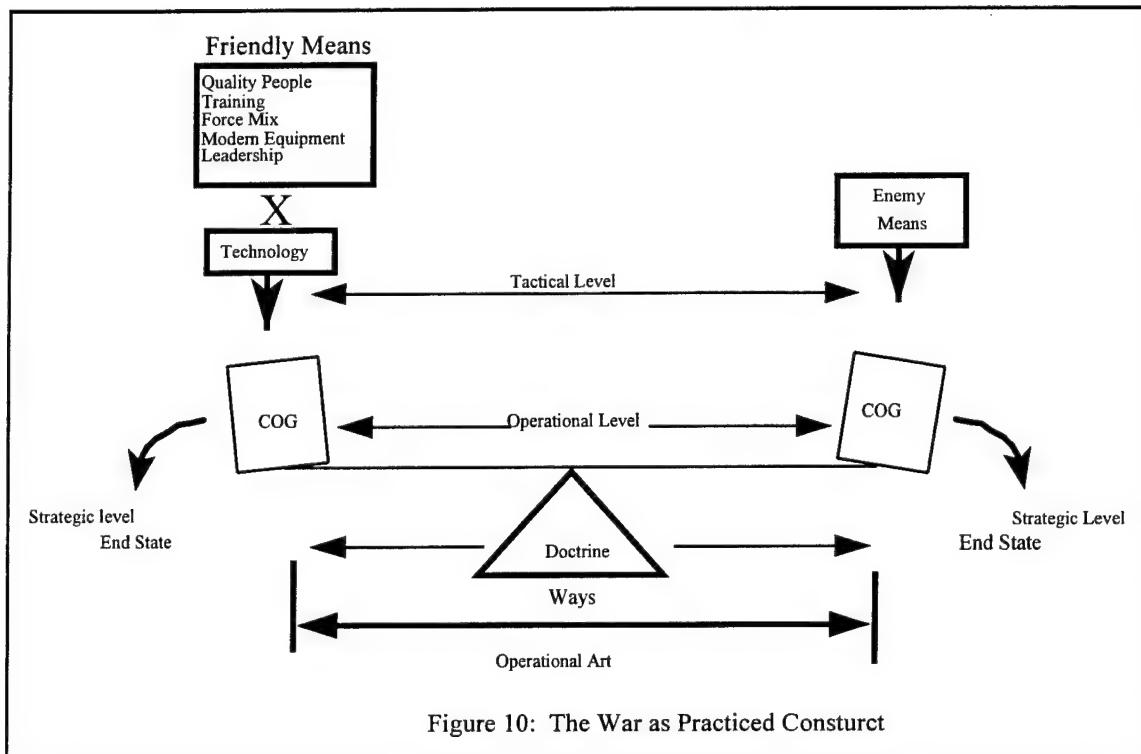
is not influenced by technology. The fulcrum begins and remains in a neutral position. In this position, the effects of single battles must generate sufficient force to unbalance the opponent's center of gravity. This condition increases the requirement for a decisive battle in order to achieve the desired end state. To reposition the fulcrum requires compounding the effects of multiple battles against the enemy. This cumulative effect normally occurs according to a plan. The preparation and execution of this plan reflects exercise of the operational art.

Operational art represents a formulation requiring special skills, skills that support an intellectual process inclusive of technological considerations. Barring military genius, the process now consists of personal and learned skills and experiences of the commander that allow him to arrange and sequence operations to obtain desired end states. Through its personal development programs, the U.S. Army tries to improve the problem solving and reasoning abilities of its leaders. This process attempts to develop *coup d'oeil* within U.S. Army senior leaders.⁴⁰

The U.S. Army expends time, energy, and resources to teach, practice, and improve these problem solving and reasoning skills in its soldiers. The army promotes initiative and flexibility in both its leadership and during the conduct of military operations. Since the 1976 version of FM 100-5, the U.S. Army has accepted the need for agility, initiative and synchronization on the modern battlefield. These tenets support the abstract requirements of applying the operational art on the battlefield. Operational art relies on the intellectual ability of the commander to see the battlefield and make decisions on the

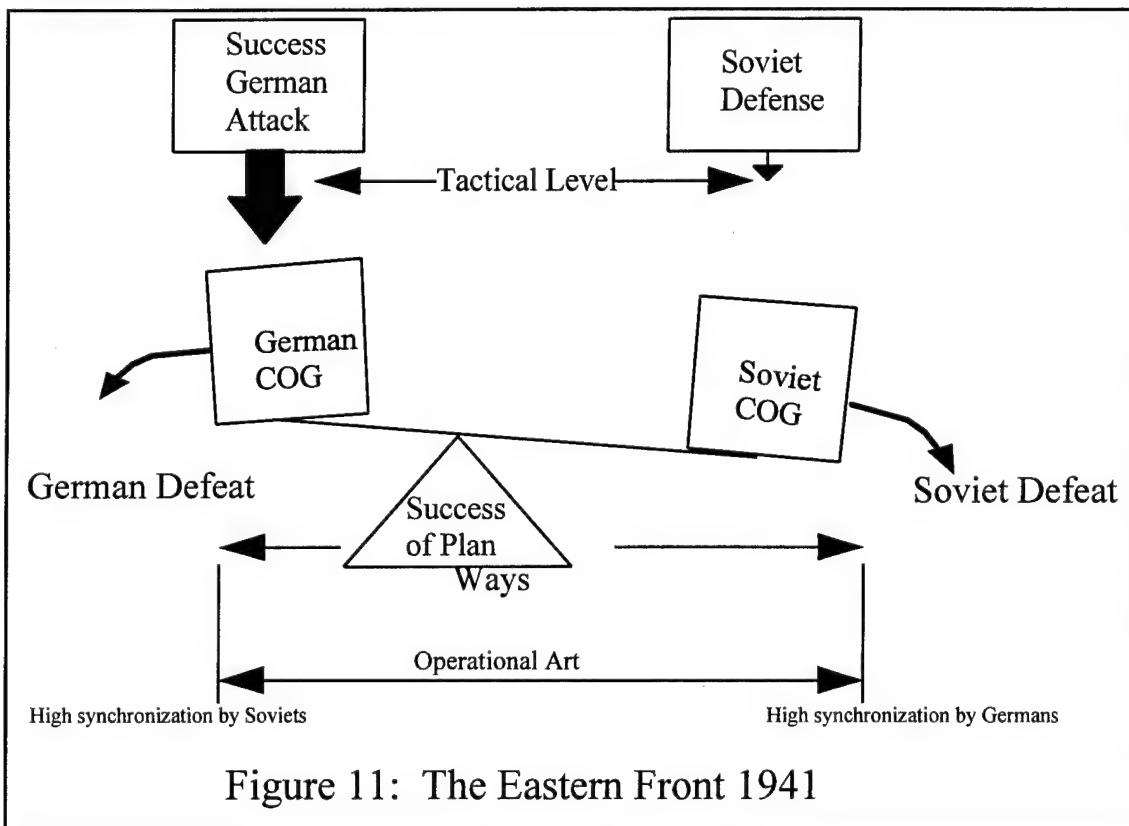
application of force against the opponent. Under these conditions technology becomes a tool for the dissemination of information required by the commander to make decisions.

Another important consideration resides in the enemy's actions. Wars entail the armed struggle between two (or more) peoples, each seeking victory. Each side therefore attempts to unbalance its opponent's center of gravity. This produces the final construct that depicts the role of operational art and technology as shown in figure 10.

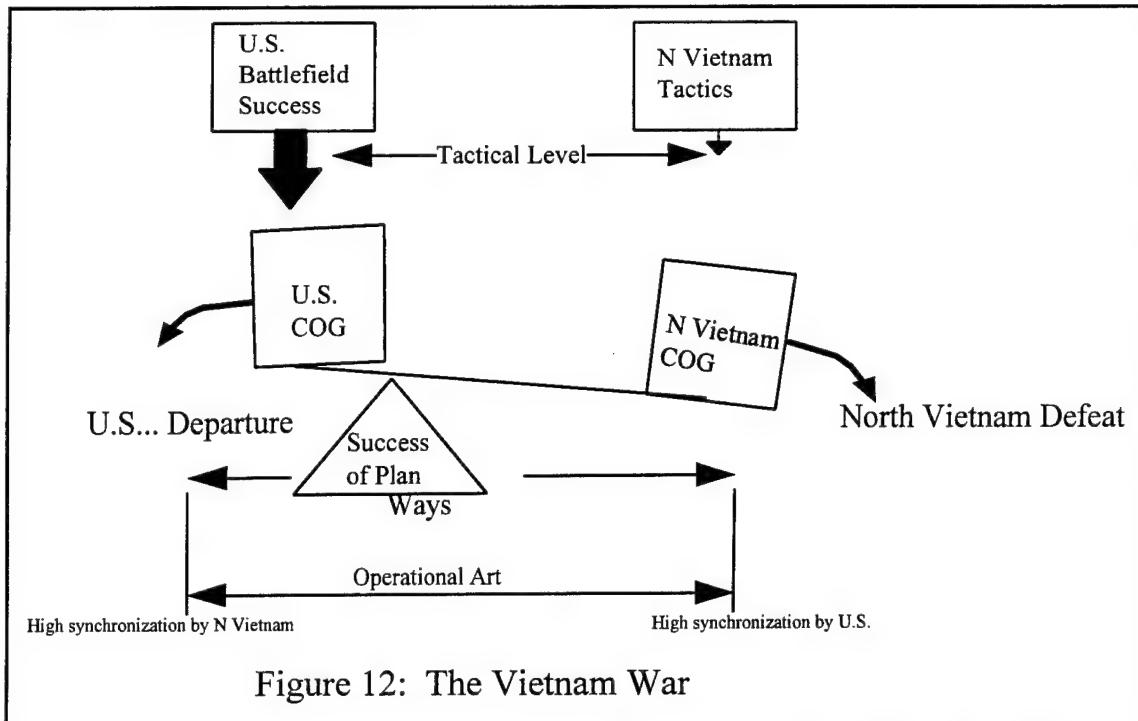


Using this construct to examine the historical case studies displays the importance of operational art in those conflicts. Figure 11 shows the impact of the operational art on the eastern front during World War II. It reflects the influence of the Soviets' operational plan to fight a delaying action moving the fulcrum to the left tipping the scales slightly in

the Soviets' favor even after taking the Germans great tactical success into account. As the war progressed and the Soviets began to experience more tactical success, the fulcrum shifted farther towards the German side of the scale, all but ensuring the eventual Soviet victory.



The same analogy applies to the Vietnam War. The U.S. dominated the tactical battlefield but failed to prosecute the war according to a plan designed to achieve the desired end state. On the other side, North Vietnam's leader's developed a long term plan designed to accomplish their desired goal (Figure 12).



These last three figures demonstrate that the ability to focus the cumulative effects of battles and engagements against an opponent results in a favorable shift in the fulcrum and that operational art is the agent that provides this compounding of effects. It is important to understand that operational art requires an intellectual structure to solve problems, reason, and make decisions that result in executable plans. These are the skills (operational art and intellectual reasoning) that will enable future soldiers to apply whatever means the nation gives to them to win on the future battlefield.

Endnotes:

¹U.S. Army, FM 100-5, Operations, June 1993, (Washington, DC: Department of the Army, 1993), glossary -8.

²Michael Howard, the imminent British historian, presented this speech when he accepted the Chesney Memorial Gold Medal award on October 3, 1973. In his speech he discussed the impact of an age of peace on the military. He believed that whatever doctrine militaries develop during an age of peace will not work. Professor Howard sees everyone starting wrong with the advantage going to the side that (1) is the least wrong and (2) adapts most quickly to the conflict. His views led to the U.S. Army's view of getting its (doctrine) about right.

³Department of the Army, Force XXI, America's Army of the 21st Century: Meeting the 21st Century Challenge, (Washington DC: Department of the Army, 1995), 22.

⁴U.S. Army, FM 101-5-1, (Final Draft) Operational Terms and Graphics, (Washington, DC: Department of the Army, July 1995), 1-200.

⁵Michael Howard, "Military Science in an Age of Peace," Journal of Royal United Services Institute for Defense Studies, vol 119, (March 1974), 3-9, reproduced at the United States Command and General Staff College by special permission, 1.

⁶Ibid., 2.

⁷Department of the Army, Army Focus, Force XXI, (Washington, DC: Department of the Army, 1994), 12.

⁸M. Mitchell Waldrop is a renowned physicist and author who details complexity theory in his book Complexity: the Emerging Science at the Edge of Order and Chaos. In his book, he tells the story of how the Santa Fe institute think tank developed the theory of complexity. After spending ten years as a senior writer for "Science" magazine, he is now a contributing correspondent.

⁹Roger Beaumont, War, Chaos, and History, (Westport, CT: Praeger, 1994), xiv.

¹⁰Ibid.

¹¹Department of the Army, Force XXI, America's Army of the 21st Century: Meeting the 21st Century Challenge, 1.

¹²Ibid., 3.

¹³Ibid., 2.

¹⁴Department of the Army, Force XXI, America's Army of the 21st Century: Meeting the 21st Century Challenge, 2.

¹⁵Ibid., 3.

¹⁶Ibid., 5.

¹⁷Ibid., 6.

¹⁸Ibid., 6.

¹⁹Department of the Army, TRADOC Pamphlet 525-5, Force XXI Operations: A Concept for the Evolution of Full-Dimensional Operations for the Strategic Army of the Early Twenty-First Century, (Fort Monroe, VA: U.S. Army Training and Doctrine Command, Aug 1994), i-ii.

²⁰Ibid., iii.

²¹Ibid., 1-3.

²²Ibid., 1-5.

²³Ibid., 2-3.

²⁴Ibid., 2-11.

²⁵Ibid., 3-1.

²⁶Ibid., 3-3.

²⁷Ibid., 3-4.

²⁸Department of the Army, FM 100-5, Operations, 1993, 1-3.

²⁹Ibid.

³⁰Paul H. Herbert, Deciding What Has to Be Done: General William E. Depuy and the 1976 Edition of FM 100-5, Operations, Leavenworth Papers Number 16, (Fort Leavenworth, KS: U.S. Army Command and General Staff College, July 1988), 22.

³¹Ibid.

³²Ibid., 36.

³³Association of the United States Army, The 1975 Army Green Book, (Arlington, VA: The Association of the United States Army, vol. 25, no 10, October 1975), 106-110.

³⁴General Friedrich Adam Julius von Bernhardi, The War of the Future, In the Light of the Lessons of the World War, translated by F.A. Holt, (London, UK: Hutchinson & Co, 1920), 27.

³⁵Christopher R. Gabel, "CGSC Historical Overview of Organizations and Curriculum, 1902-05," (Combat Studies Institute, U.S. Army Command and General Staff College), Dr Gabel gave this presentation to the faculty and staff of the U.S. Army Command and General Staff College's Combat Studies Institute during the fall of 1995.

³⁶Bryan I. Fugate, Operation Barbarossa: Strategy and Tactics on the Eastern Front, 1941, (Novato, CA: Presidio Press, 1984), 21, 24-25.

³⁷Carl von Clausewitz, On War, edited and translated by Michael Howard and Peter Paret, (Princeton, NJ: Princeton University Press, 1976), 595-6.

³⁸Thomas Keaney and Eliot A. Cohen, Gulf War Air Power Survey Summary Report, (Washington, DC: U.S. Government Printing Office, 1993), 238.

³⁹Ibid.

⁴⁰*Coup d'oeil* describes what Clausewitz called the inner eye; the ability to see the required path and take it. On War, 102.

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